



Kristu Jayanti College

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ANNUAL NEWSLETTER

FEBRUARY 2023

SYNAPSE

DEPARTMENT OF LIFE SCIENCES

VOLUME 8

FOREWORD

The life sciences are those branches of science that focus on the study of living things, including humans, animals, and plants. While biology continues to be the core of the life sciences, technological developments in molecular biology and biotechnology have given rise to new multidisciplinary fields and a proliferation of specialties.

Research in life sciences in the last century has provided advances in agriculture and industrial development while transforming the practice of medicine. Major advancements have been made in the field of biopharmaceutical products, such as the development of human recombinant insulin for the treatment of diabetes, a hepatitis B vaccine, and drugs for the treatment of cancer, arthritis, multiple sclerosis, and cystic fibrosis.

The Department caters to knowledge and skill enrichment in interdisciplinary areas of Life Sciences (Biotechnology, Microbiology, Biochemistry, Genetics and Botany). Most students taking life sciences courses will be majors in one of the life sciences disciplines. Students in these programs have a variety of ambitions for the future including further graduate-level study, professional programs, and immediate employment in their chosen fields and industries.

The vision of the department is envisioning wholeness through Life Science education and research. The education mission is to enkindle responsible creativity and strive for human transcendence through scientific prowess. Our hope is for a learning community that engages students in learning that is relevant for the 21st century and provides them the skills to be critical and ethical thinkers capable of independent and lifelong learning.

'Synapse'- an annual newsletter of the Department of Life Sciences, Kristu Jayanti College is a collection of articles and thoughts penned by the students of the Department. The students have tried to communicate new updates in the research areas of Life Sciences. It is a matter of delight that this useful collection of highly informative articles from our students conjures up the current and continued efforts in research as there are still many unknowns to many of them.

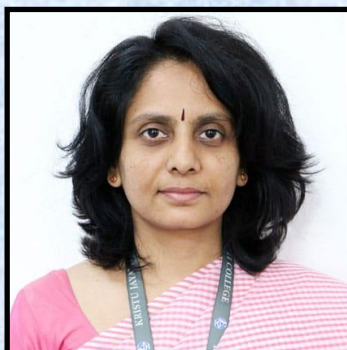
EDITORIAL COLUMN

Synapse'- an annual newsletter of the Department of Life Sciences, Kristu Jayanti College is a collection of articles and thoughts penned by the students of the Department. The students have tried to communicate new updates in the research areas of Life Sciences. It is a matter of delight that this useful collection of highly informative articles from our students conjures up the current and continued efforts in research as there are still many areas to be explored. We hope that the newsletter will answer many questions pertaining to technological advances in the field of Life Sciences. This newsletter also provides insight on the departmental activities and achievements of students and faculty.

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MESSAGE FROM THE PRINCIPAL

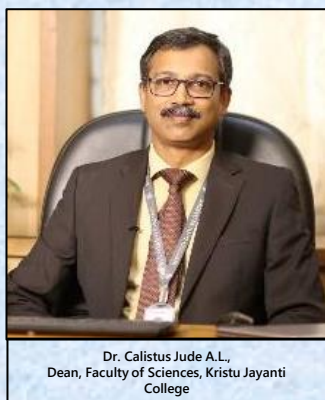
Science has undergone a fundamental transformation from conventional in vivo discovery methods (understanding genes, metabolic pathways, and cellular mechanisms) to electronic scientific discovery, which entails gathering measurement data using various technologies and annotating and examining the resulting electronic data sets. Life scientists need tools that allow them to access, integrate, mine, analyse, interpret, model, and display the vast amounts of complex and varied electronic biological data in order to deal with this rapid shift. There are many obstacles in the way of developing suitable technology. I am immensely happy to note that the Department of Life Science's is bringing out its annual newsletter 'Synapse' for the academic year 2022-23. The department has been actively involved in conducting many activities over the years in creating opportunities for students and faculty in their academic development. During the path in the preparation of Synapse, I am certain that the creativity and the inquisitiveness of the students' would have been enkindled. I wish the editorial team the very best.



Rev. Dr. Augustine George
Principal, Kristu Jayanti College

MESSAGE FROM THE DEAN

It is a delight that the eight edition of "Synapse" - the newsletter of the Department of Life Sciences highlighting the important events at the department and views of our students being published. I appreciate the earnest endeavor of the department in organising various academic enrichment activities and co-curricular events during the academic year to create a holistic learning experience for the students. The department is one of the finest in offering the best learning experience for the student members. From its contribution in being ranked consecutively by the India Today MDRA Survey (2022) as the Best Emerging College in Science at the National Level to the top ranking of its programmes at the National and Regional levels, its recognition by the DBT, Govt. of India as a Star College, collaboration with eminent institutions for various academic enrichment programmes, and many more, the Department has so much to be proud of. Our students have also brought incredible success to the department and our faculty members have celebrated many achievements. This edition of Synapse is sure to give a greater insight into the approaches to teaching and learning, and the various activities and achievements of the department and its members. I specially congratulate and thank the editorial team for their effort in bringing out this issue.



Dr. Calistus Jude A.L.,
Dean, Faculty of Sciences, Kristu Jayanti
College

MESSAGE FROM THE HEAD OF THE DEPARTMENT

The Department was sanctioned support under the strengthening component of the Star `College Scheme by the Department of Biotechnology (DBT), Ministry of Science & Technology, and Government of India in April 2020. With the team of committed and well-trained faculty members, a thoughtfully formulated curriculum, contemporary teaching-learning pedagogy, and state-of-the-art laboratories, the department has been successful in training students to land in careers that are fulfilling. The Department aims at the holistic development of students by providing them with various co-curricular and extra-curricular activities. There are a variety of co-curricular flagship of programmes of the department and institution that open vistas for student's professional development. 'Synapse'- an annual newsletter of the Department of Life Sciences is a compilation of science articles contributed by the students of the department. I congratulate and appreciate the editorial team for their effort in bringing out this issue.



Dr. Elcey C.D.,
Head, Department of Life Sciences.



STUDENT CORNER

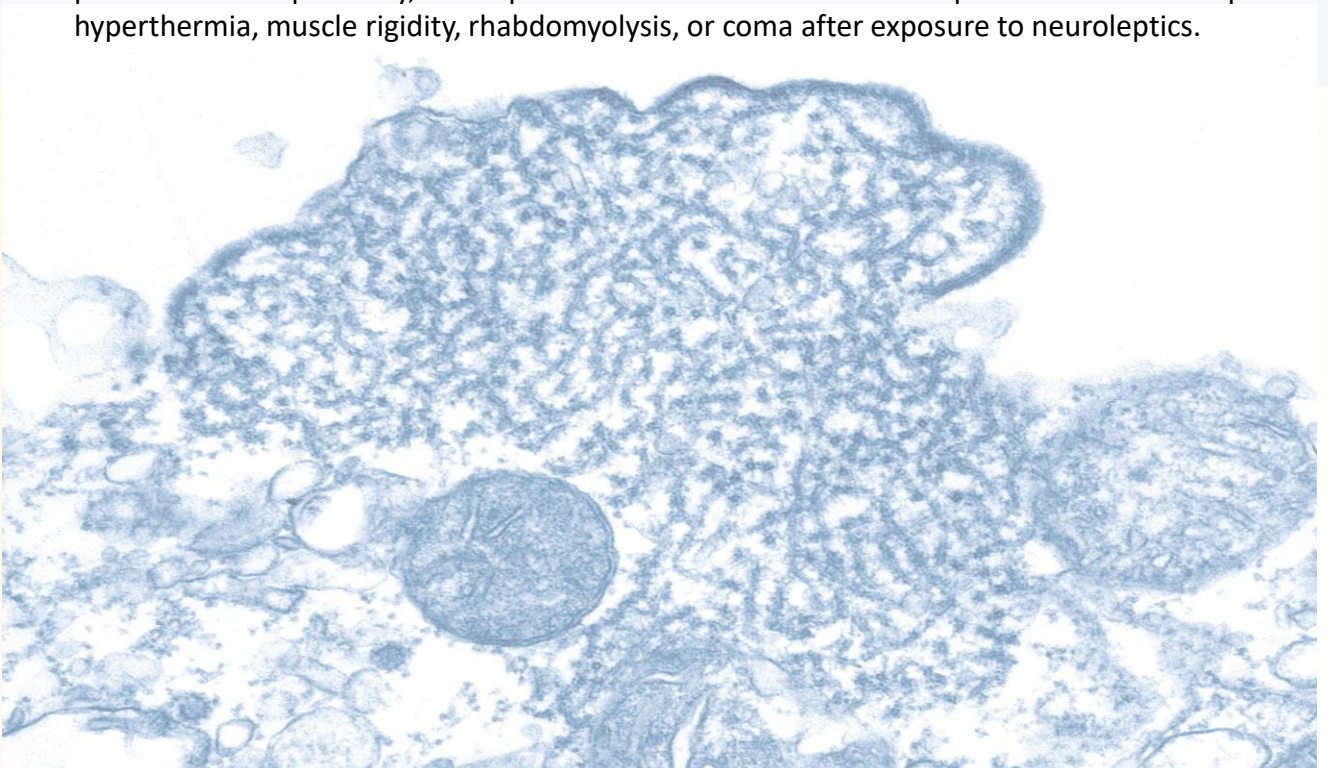


Anti-NMDA Receptor Encephalitis

Anti-NMDAR antibody immune encephalitis is a B-cell mediated autoimmune encephalitis with an actual pathogenic antibody that can be removed by plasma exchange resulting in improvement of the underlying pathology. The disease starts with a prodromal state mimicking common viral infections. But within weeks to a few months (less than 3 months), complex neuropsychiatric features emerge rapidly during the psychotic phase. Presenting clinical features may be different between children and adults. Adults usually present with psychiatric symptoms compared with movement disorders or seizures as the most common presentation in children. Acute or subacute behavioral symptoms are the most common presenting features in adult patients.

Though there is no specific psychiatric phenotype, variable positive and negative psychiatric symptoms such as visual or auditory hallucination, acute schizoaffective episodes, depression, mania, and addictive or eating disorders can appear rapidly within days to weeks in these patients with no prior psychiatric diagnosis. The onset occurs fairly quickly in contrast to the slow progression noted in primary psychiatric diseases.

Many patients get admitted to the psychiatric inpatient unit due to severe presentation and spend weeks for symptomatic management. Although several patients would have coexistent neurological features at the onset, some may develop within a few weeks of presentation. Importantly, some patients are intolerant to neuroleptics and can develop hyperthermia, muscle rigidity, rhabdomyolysis, or coma after exposure to neuroleptics.

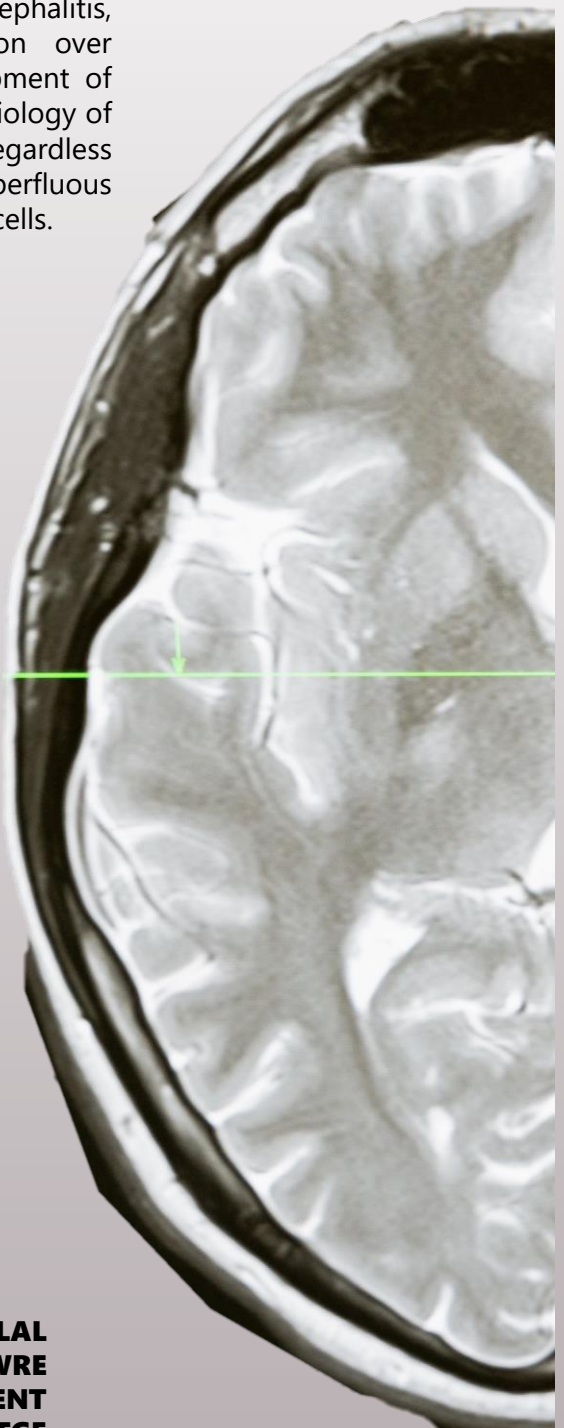


Anti NMDA Receptor encephalitis is an autoimmune encephalitis characterized by complex neuropsychiatric features and the presence of Immunoglobulin G (IgG) antibodies against the NR1 subunit of the NMDA receptors in the central nervous system(CNS). These antibodies are identifiable in the serum or the cerebrospinal fluid (CSF). This autoimmune encephalitis develops due to the formation and attachment of IgG, particularly IgG1 and G3, to NMDA receptor (NR1) subunit with subsequent internalization of NMDA (glutamate) receptors, reduction of neuronal Ca influx, and decrease in the receptor-dependent synaptic currents.

In some patients, antibody production becomes triggered by associated ovarian teratoma and rarely other tumors. Viral encephalitis, particularly Herpes Simplex Virus encephalitis, can correlate with NMDAR antibody production over the ensuing three weeks with subsequent development of autoimmune encephalitis. In most cases, the exact etiology of antibody production remains unknown, however, regardless of the origin, the pathogenesis leads to a superfluous production of autoantibodies by intra thecal plasma cells.

Autoimmune encephalitis was classified in the past as paraneoplastic or non-paraneoplastic, depending on whether there are any identifiable tumor-associated antibodies. These paraneoplastic antibodies included anti-neuronal nuclear antibody type 1 (anti-Hu), anti-Ri, or Yo, etc. With a better understanding of the pathophysiology of different auto-immune encephalitis, the more nuanced way of classification is pathophysiologically based.

The modern-day classification is to classify the immune encephalitis according to the targets of the antibodies. The classical paraneoplastic encephalitis, as named above, is mediated through a predominant T-cell mediated mechanism with cytotoxic T cells demonstrated in the pathological specimens. These immune responses are the result of molecular mimicry between the neuronal tissue antigen and tumor antigens. The antibodies themselves are not pathogenic. These antibodies direct their activity towards intracellular constituents. The other class of autoimmune encephalitis consists of antibodies directed against synaptic or cell-surface antigens such as anti-NMDAR, anti-GAD, anti-VGKC antibody-mediated encephalitides. These are real antibody or B-cell mediated autoimmune encephalitis with real pathogenic antibodies.



DEVIKRISHNA SINILAL
DILESWARI KAWRE
PEARL ELIZABETH VINCENT
1st year BSc. BTGE

Artificial Womb Facility

On Friday December 9, a film maker and biotechnologist by the name of Hashem Al Ghaili from Berlin released a concept video of an Artificial womb facility called Ectolife. Ectolife is a concept for the world's first artificial womb facility that will be able to grow 30,000 babies per year. According to him it is based on over 50 years of groundbreaking scientific research conducted by researchers worldwide. He said the facility would allow infertile couples to conceive a baby and become true biological parents. The facility could also have an 'Elite package', that would allow the couples to genetically engineer the embryo before implanting it into the artificial womb. This enables humans to alter everything right from the height and eye colour to the hair colour and intelligence of the fetus.

Ectolife is powered entirely by renewable energy. It is designed to alleviate human suffering and reduce the chances of C-sections and can also eradicate premature births and C-sections. Ectolife also aims to become a solution for women who have lost their uterus to cancer and other complications. Ectolife allows your baby to develop in an infection free environment. The pods are made of materials that prevent germs from sticking to their surfaces. Every growth pod features sensors that can monitor your baby's vital signs, including heartbeat, temperature, blood pressure, breathing rate, and oxygen saturation. Ectolife through its technology and goals could possibly pave a way onto a brighter and better future to a broad spectrum of people.

Nishanth Selvakumar
3rd year BSc. BBB

Antimicrobial Resistance

Antimicrobials are medicines used to prevent and treat infections in humans, animals and plants. Antimicrobial resistance occurs when microbes undergo genetic changes over time and no longer respond to medicines making infections harder to treat and increasing the risk of disease spread, severe illness and death. As a result of drug resistance, antibiotics and other antimicrobial medicines become ineffective and infections become increasingly difficult or impossible to treat.

Antimicrobial Resistance occurs naturally over time, usually through genetic changes. Antimicrobial resistant organisms are found in people, animals, food, plants and the environment. The emergence and spread of drug-resistant pathogens that have acquired new resistance mechanisms, leading to antimicrobial resistance, continues to threaten our ability to treat common infections. Antimicrobials are becoming increasingly ineffective as drug-resistance spreads globally making it more difficult to treat infections.



Without effective tools for the prevention and adequate treatment of drug-resistant infections and improved access to existing and new quality-assured antimicrobials, the number of people for whom treatment is failing or who die of infections will increase. Medical procedures, such as surgery, including caesarean sections or hip replacements, cancer chemotherapy, and organ transplantation, will become more risky.

Debabrata Chakraborty
1st year BSc. MBGE

Evolution of Microbiology

Microbiology is a branch of science that deals with the study of diverse microorganisms, including bacteria, fungi, algae, protozoa and fungus. Microorganisms make a significant contribution for the importance to human life.

India can also take pride in contributing to the development of ancient microbiology in the form of septic tanks in the Mohenjodaro and Harappa regions (3000 B.C). The existence of microbes was not established until Antony van Leeuwenhoek (1677) could see in a simple (one – lens) microscope. Leeuwenhoek, a cloth merchant from Delft, Holland spent much of his time in grinding tiny lenses of high magnification (300x). He took the scurf from the root of the decayed tooth and mixed it with clean rainwater, and saw the mobility in animalcules.

He then discovered the major classes of bacteria (spheres, rods, and spirals), protozoan, algae, yeasts, erythrocytes, spermatozoa, and capillary circulation.

Leeuwenhoek's discoveries were described in a flow of letters to the Royal Society of London. Aristotle emphasized that animals might evolve spontaneously from the soil, plants or other substances unlike humans and animals.

The Golden era of microbiology started with the work of Louis Pasteur (France) and Robert Koch (Germany). Louis Pasteur conducted the swan-neck flask experiment where the dust particles would settle as the air entered thus the culture medium remained sterile disproving the theory of spontaneous generation.

Ashvita Prajith
1st year BSc. MBGE



The Superworm and it's Surprising Ability

Superworms like mini recycling plants shred the polystyrene with their mouths and then feed it to the bacteria in their gut.

Based on the research conducted in the University Of Queensland, the common Zophobas morio 'superworm' was found to eat through polystyrene, thanks to a bacterial enzyme in their gut. The superworms were fed different diets over a three weeks period, with some given polystyrene foam, some bran and others were put on a fasting diet. It was found that the superworms which were fed a diet of just polystyrene not only survived, but had marginal weight gains too. This suggests the worms can derive energy from the polystyrene, most likely with the help of their gut microbes. The researchers used a technique called metagenomics to find several encoded enzymes with the ability to degrade polystyrene and styrene. The long-term goal is to engineer enzymes to degrade plastic waste in recycling plants through mechanical shredding, followed by enzymatic biodegradation.



Superworms like mini recycling plants shred the polystyrene with their mouths and then feed it to the bacteria in their gut. The breakdown products from this reaction can then be used by other microbes to create high-value compounds such as bioplastics. With this revolutionary breakthrough, hopes for landfill reduction as well as plastic recycling is aimed.

Tapobrata Chattaraj
1st year BSc. MBGE



The Human Microbiome

Did you know that there are more microorganisms than human cells which reside in and on our bodies. The human microbiome consists of approximately 10-100 trillion of these microbial cells. It contributes to our body by helping us digest our food, maintain our immune system, protect ourselves against other bacteria which may cause disease and produce vitamins including Vitamin B and Vitamin K, which is needed for blood coagulation.

Our bodies are home to thousands of microorganisms known as the microbiome. Microbiome is used to describe a community of all kinds of microbes like bacteria, viruses, fungi, and protists which inhabit various parts of the body including the mouth, skin, respiratory tract and the gastrointestinal tract. This term was first coined by American molecular biologist, Joshua Lederberg in 2001. The gut microbiome is one of the main foundations of the human microbiome. It comprises of nearly 1000 species of bacteria which are essential for the health and wellness in humans. Specifically, the gut microbiome is found in a "pouch" called the cecum, which connects the small intestine to the colon, which is a part of the large intestine. Interestingly, these microbes together weigh around 1-2 kg which is almost the weight of the brain and can be considered as an extra organ.

Hannah Joseph
1st year BSc. MBGE

Microbiology

Most people today, even those who know a very little about microbiology, are familiar with the concept of microbes and their role in human health. From our school days we have learned about bacteria, viruses and other microorganisms.

Humans have been living with and using microorganisms for much longer than they have been able to see or know anything about them. So was the study about microbiology ever required? It was only in the recent decades, the diseases which have emerged with pathogens including zika virus, nipah virus and then the novel corona virus (COVID-19) which impacted our lives to such an extent, that the term microbiology and its importance came into light.

Sania Johnson
1st year BSc. MBGE



Role of Metabolism in Biosynthesis and Growth

During the process of polymerization, proteins, nucleic acids, polysaccharides, and lipids are converted into proteins by microbes. It is necessary that the building blocks are either already present in the growth medium or they must be synthesized by the growing cells themselves. It is important to note that the presence of coenzymes that are involved in enzymatic catalysis places additional requirements on biosynthetic processes. Biosynthetic polymerization reactions demand the transfer of anhydride bonds from adenosine triphosphate (ATP). For the formation of anhydride bonds and the maintenance of transmembrane gradients of ions and metabolites, growth requires a source of metabolic energy.

Catabolism and anabolism are the two processes that make up metabolism. The term "catabolism" refers to a group of biological processes that employ the energy released through the breakdown of substances (such as glucose) to create ATP. In contrast, anabolism, or biosynthesis, entails procedures that use the energy stored in ATP to create and put together the constituent parts, or "building blocks," of the macromolecules that make up the cell. One of two factors determines the order of the constituent parts in a macromolecule. It is template-directed in nucleic acids and proteins. While messenger RNA acts as the template for the synthesis of proteins, DNA serves as the template for both its own synthesis and the synthesis of the various forms of RNA.

Contrarily, the positioning of the building components is different in lipids and carbs. In order to maintain a balance in biosynthesis, the rate of macromolecular synthesis and the activity of metabolic pathways must be controlled. For orderly growth, all of the elements necessary for macromolecular synthesis must be available, and control must be used to prevent the cell's resources from being used to make molecules that do not aid in growth or survival.

Ron Aji

1st year BSc. MBGE



Stem Cells – The Future of Cancer Treatment

Our bodies contain a pool of stem cells that have the ability to differentiate into any other cell type in the body. Organs and tissues are built up by specialized cells from the pool of stem cells that form shortly after fertilization. Stem cells play an important role in repairing damaged tissue and replacing cells that are lost every day. Stem cells are widely defined by two main characteristics: the ability to self-renew (divide in a way that reproduces more identical stem cells) and to differentiate (to turn stem cells into specialized cells that form different organs and tissues).

There are many different kinds of stem cells that exist for different periods of a human's lifetime. For example, embryonic stem cells exist only at the earliest stage of embryo and adult stem cells appear during fetal development and are retained throughout life.

In recent times stem cells are considered a useful tool for cancer treatment. The potential of stem cell engineering to help revolutionize cancer treatment has been seen in recent times. They are being utilized to renew the immune system for radiation or chemo-therapy treated patients for a long time. Recently, stem cells are being engineered to carry therapeutic reagents to target tumor sites. Also cancer vaccines based on the knowledge of cancer stem cells have been studied and applied for cancer treatment.



Scientists have also discovered how to reprogram normal cells to behave like embryonic stem cells which is done by re-activating critical genes that define embryonic stem cells to make adult stem cells revert to an embryonic-like state of pluripotency. These cells are called induced pluripotent stem cells (iPSCs).

In another radical method stem cells are used as vehicles to carry drugs or therapeutic vector viruses to tumors. This is referred to as gene therapy and is used for cancer treatment. This is possible as Stem cells possess two crucial advantages that determine their potential application for gene therapy: tumor tropism and immune-privilege.

Marissa Anastasia J. Fernandes

1st year BSc. BTGE

Through the Eyes of Leeuwenhoek

**The "Father of Microscopy".
He was the first to observe
tiny unicellular
microorganisms in 1676.**

Antony Van Leeuwenhoek was known for his exceptional skill in grinding lenses and for the discovery of bacteria, viruses, nematodes, protists, etc. He is famously known as the "Father of Microscopy". He was the first to observe tiny unicellular microorganisms in 1676 inside water in a lake and called them 'Animalcules'. Leeuwenhoek was able to isolate the same from various water sources like rainwater, ponds and well water as well. He was able to observe flagellate *Giardia*-a parasitic protozoan in a sample of his own faeces, and various kinds of bacteria present in his own mouth. He investigated aspects of reproduction, and discovered parthenogenesis by dissecting aphids.

He observed and conducted studies on green algae, observed the life-cycles of maggots, depicted their process of reproduction from eggs to adults. He also studied the crystals in Gouty tophi (a kind of lump that protrudes from the skin) and noticed the blood flow in capillaries. Leeuwenhoek sent various letters to the Royal Society which, in the beginning rose suspicions about the genuineness of his discoveries. It took until 1677 for all of his discoveries to be accepted, after being examined by Robert Hooke. This led to the rise of a great microbiologist. Though he provided us with innumerable discoveries, his extraordinary technique of making lenses remains a secret till date!



Diya Ragesh

1st year BSc. MBGE

Polycystic Kidney Disease

Polycystic kidney disease (PKD) is a common genetic disorder, and it's thought to affect over 12 million people every year. PKD causes fluid filled cysts to form in the kidney, causing pain and high blood pressure. Eventually, the cysts become so large that they impair the function of the organ, resulting in kidney failure. Patients often require kidney transplants or dialysis. Researchers have now used Kidney organoids, three dimensional, miniaturized, and simplified version of human kidney to reveal about the disease

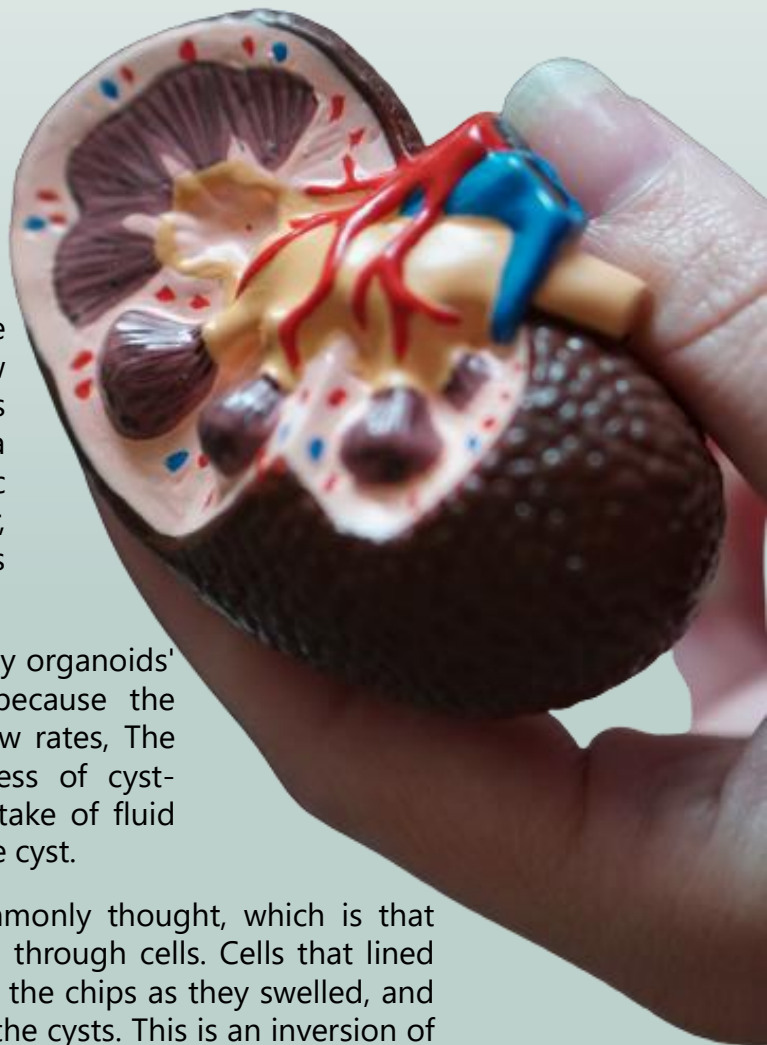
When the organoid models that were genetically engineered to mimic PKD were exposed to increasing levels of sugar, the cysts began to get larger. But it relates less to blood sugar level and more to how kidney cells take in sugar, which in this process seemed to go rogue and give rise to cysts,

In this study, the researchers were interested in investigating fluid flow in the kidney and how it influences PKD development. They combined a kidney organoid and microfluidic chip, and moved a mixture of water, sugar, amino acids, and nutrients over the organoid-on-a-chip models.

The investigators expected the kidney organoids' cysts to get bigger under flow because the disease is linked to physiological flow rates, The surprising part was that the process of cyst-swelling involved absorption: the intake of fluid inward through cells from outside the cyst.

That's the opposite of what is commonly thought, which is that cysts form by pushing fluid outward through cells. Cells that lined the PKD cyst walls faced outward on the chips as they swelled, and the tops of the cells were outside of the cysts. This is an inversion of the normal orientation, in which cells should be facing inward in healthy, live kidneys. The research suggested that cysts can get bigger by absorbing fluid that is rich in sugar, and not by secreting liquid.

Sugar absorption drives cyst growth in polycystic kidney disease.



**-Josna Anni John
1st year BSc. BTGE**

He Solved One, And Caused Many

Until the 19th century, cars needed to be hand cranked to start until the year 1912, when the world's first crank-less car, Cadillac Model 30 was unveiled. It was much more powerful than the former cars. The Model 30 was a huge success for Cadillac, it doubled the company's annual sales, however it had a problem. It was deafeningly loud due to which the phenomenon became known as engine knocking. Hired by Henry Leland, founder of Cadillac, Charles Kettering wanted to find an additive which would increase the octane rating of ordinary fuel and eliminate knocking in high-compression engines. So, he hired a 27-year-old engineer, Thomas Midgley Jr. On December 3, 1921, after five years of working on the problem, Midgley found what he thought was the perfect solution, "tetraethyl lead".

This additive was exactly what he was looking for. It stopped the knocking, it didn't smell. It was cheap to produce and readily available. Midgley and Kettering patented the process for making Tetraethyl lead, and they called their new additive Ethyl. They made no mention of lead. Then they teamed up with three of America's largest corporations General Motors, DuPont and Standard Oil of New Jersey to form the Ethyl Corporation. Within 2 months of operation in their chemical plant at Jersey, dozens of workers fell ill with lead poisoning leading to deaths.

To address the public outcry, Midgley held a press conference. And there he poured Tetraethyl lead onto his hands, and he inhaled it for a full minute. He claimed he could do this daily without harm. But Midgley knew the dangers. He had spent much of 1923 in Florida, where he himself was recovering from lead poisoning.

By the 1950s, millions were burning lead in their cars and releasing it into the air. Clair Patterson, a chemist who had worked on the Manhattan project, through his experiments and studies revealed that 20th century Americans had 1000 times more lead in their bones than their ancestors. Studies of baby teeth revealed that even Lead exposure below the safety limit resulted in delayed learning, decreased IQ and increased behavioral problems.

Mayank Bharti
1st year BSc. BTGE



Thomas Midgley

Gender and Autoimmunity



Autoimmunity is a condition where the body's immune system mistakenly recognises the body's own tissues as foreign bodies and reacts against them. The reason as to why autoimmunity occurs is not fully understood as of now. Although various factors such as genetics, environment or even infections have been linked to its occurrence. There are various hypotheses on the root cause of autoimmunity. Usually, any lymphocytes that could trigger an immune response against the body's own cells are not allowed to mature. For example, B cells produce autoantibodies to prevent maturation. For an unknown reason, this process fails to occur, and thus autoimmunity is caused.

As stated above, multiple factors have been linked to a higher incidence of autoimmunity. One such factor is the sex of the individuals. It has been noted that a higher percentage of individuals affected with autoimmune disorder are women. Women account for 80% of patients with autoimmune diseases. There is clearly a gender bias that is present with the occurrence rate of women to men being 2 to 1. These statistics raise a serious question as to why this occurs.

One reason for the prevalence of autoimmunity in women can be linked with X chromosome and its inactivation in females. The X chromosome is said to have a greater number of genes that are related to immune activity. Genes that are responsible for immune regulatory actions and induction of immunological responses are present on the X chromosomes. Since there is an increased number of immune related genes present, there is also a high chance of mutation to occur in these genes. Since women have 2 X chromosomes, there is a higher chance of women acquiring autoimmunity. Although X chromosome inactivation occurs, this inactivation occurs in various segments of the different chromosomes, that is all women, genetically can be considered to be mosaics. Since inactivation occurs in segments of the X chromosome, sometimes the expression could be more of the paternal X chromosome or the maternal X chromosomes. Since there are 'double doses' of these genes, there is a higher chance of a woman expressing the mutated version of the gene which could develop into autoimmune disorders.

The sex of the individual is a clear factor to consider when studying the development of autoimmune disorders. The sexual dimorphism that is present in the immune function of an individual has not been fully understood or studied. Although it is clear that more research is required in this area to come to a definitive answer as well as acquire more knowledge on it. It is of utmost importance for research to occur as it will help us fully grasp autoimmunity, infections and how to counteract them effectively.

Karyotyping

Karyotyping is a test to examine chromosomes in a sample of cells. It is done in laboratories and diagnostic centers to either study chromosomes for research or to diagnose a genetic disease.

It is carried out as follows:

A flask containing a subculture of cells is taken. Its confluency (i.e. density of cells) is checked under a microscope. If it is about 80 percent, it is taken into a laminar airflow unit. Here, 300 μ L of colchicine is added to the culture so that cells are arrested at metaphase and is then kept in the incubator and incubated for 2 hours at 37°C. After the incubation period, the flask is taken back to the LAF, and the spent media is removed. Then, phosphate buffered saline is added to the cells to remove any dead cells that may be present. The PBS is removed and then trypsin is added to detach the cells from the surface of the flask. The flask is then incubated for full effect. This is then returned to the LAF where it is transferred to a centrifuge tube and centrifuged at 1000rpm for 8 minutes. .

Karyotyping is a test to examine chromosomes in a sample of cells.

After centrifugation, the supernatant is discarded, and potassium chloride is added to the pellet and is left undisturbed for 15 minutes. Potassium chloride would swell up the cells so that the chromosomes burst out. The pellet is then gently mixed and centrifuged again.



The supernatant is discarded and 1ml of cold fixative (methanol and glacial acetic acid in a 3:1 ratio) is added to fix the cells and mixed. To this, 4ml of cold fixative is added and incubated for 15 minutes in ice. This is then centrifuged, and the process is repeated four times. After the last centrifugation step, 0.5ml of cold fixative is added to the pellet and mixed. A drop of this added to a chilled slide from a distance of 1 foot from the slide so that the chromosomes spread across the slide. This is air dried, and 2-3 drops of Giemsa stain is added and left for fifteen minutes. Excess stain is then washed off

Jane Samuel
1st year BSc. MBGE

Nanoceria: An Innovative Strategy for Cancer Treatment

Nanoceria or cerium oxide nanoparticles characterized by all the coexisting of Ce^{3+} and Ce^{4+} that allows self-regenerative, redox-responsive dual-catalytic activities, have attracted interest as an innovative approach to treating cancer. Depending on surface characteristics and immediate environment, nanoceria exerts either anti or pro-oxidative effects which regulate reactive oxygen species (ROS) levels on biological systems. Despite reported preclinical successes, there are still knowledge gaps arising from the inadequate number of studies reporting findings based on physiologically relevant diseases models that accurately represent the complexities of cancer.

Cancer is the general term utilized to demonstrate a heterogeneous group of diverse disease characterized by rapid, uncontrolled growth of abnormal cells that can affect any part of the body.

Nanoceria as Potential Cancer Therapeutic Agent

The unique properties of nanoceria that favors as an oxidizing agent under acidic and hypoxic conditions, which are both key features of aggressive tumor progressions, while acting as an antioxidant under physiological conditions to protect normal cells presents it as an attractive anti-cancer agents.

Effects On Healthy Cells and Normal Tissues

Nanoceria based therapeutic agents have been shown to selectively deplete or generate cytotoxic ROS depending on the pH of the microenvironment. Acidic cancerous tissues were killed but normal tissues at neutral pH were spared as nanoceria acted as ROS scavenger, producing non-toxic water and oxygen.

Conclusion and Future Perspectives

Nanoceria based therapeutics in pre-clinical studies focused on resolving tumor hypoxia, which is the Hallmark of TME positively correlated with poor prognosis. Over consumption of oxygen by the rapid proliferation of tumor cells leads to chemotherapy tolerance and insensitivity of PDT and RT.

Muskaan Tanaaz
1st year BSc. BTGE

Invasion of *Parthenium hysterophorus*

Parthenium hysterophorus is an aggressive ubiquitous annual herbaceous weed with no economic importance unrevealed till now. This erect, ephemeral herb known for its vigorous growth and high fecundity specially in warmer climates is a native of north-east Mexico and is endemic in America. It is commonly known as 'altamisa', carrot grass, bitter weed, star weed, white top, wild feverfew, the "Scourge of India" and congress grass.

Parthenium hysterophorus (asteraceae) is a noxious plant that is considered one of the most invasive species in the world.

Parthenium weed is unimaginably ruinous, it slaughters other plants species inside nearness through allelopathic and can clear but yields of whole fields. The plants quick development rate and seed creation make extraordinarily hard to control when effectively settled in a given territory. *Parthenium* developing in horticultural regions can harm animals which thus would then be able to influence human well being.

At the first glance, a one metre tall *Parthenium* plants looks innocuous. Its tiny cream flowers, born on several frail, pale green stalks, dance in the winds.

The *Parthenium hysterophorous* is an early raised plant of green – whitish shading. It is stretched and with the stems selfishly shaggy. It will grow from 30 to 40cm, however can arrive at 2metre. The leaves are substitute and significantly cut into restricted fragments. Inflorescences are gathered by 4 Or 5, in little round heads.

By *P. hysterophorous* invasion both native and non native species were supported or replaced respectively. The concentration of soil nitrogen and organic matter were significantly higher in transitional and invaded plots then in non invaded plots. Soil pH, phosphorous and potassium were highest in the invaded plots, lowest in the non invaded and intermediate in the transitional plot. Due to changes in above ground vegetation and below ground soil nutrients contents, *P. hysterophorous* invasion is likely to have an overall negative effect on the functional of the entire ecosystem. Therefore, management of noxious *P. hysterophorous* is necessary to prevent future problems.

Kumud Pandey
1st year BSc. BTGE



How do Viruses Mutate?

As SARS-CoV-2 spreads around the globe, it is mutating, in other words it is acquiring genetic changes. While the idea of "viral mutation" may sound concerning, it's important to understand that many of these mutations are minor, and don't have an overall impact on how fast a virus spreads or potentially how severe a viral infection might be. In fact, some mutations could make the virus less infectious.

Mutation is a natural process that causes a permanent change in genetic material i.e the DNA or RNA of a virus, leading to changes in their genetic makeup. These changes can result in variations in the virus's characteristics, such as its ability to infect different host cells or resist antiviral drugs. Mutation can occur through errors in replication or through exposure to environmental factors such as UV radiation or certain chemicals.

Mutations can also occur in response to selective pressure, such as the use of antiviral drugs or vaccines. When a virus is exposed to a drug or vaccine, the strain that is able to evade the treatment will survive and replicate, leading to the emergence of drug-resistant or vaccine-resistant strains.

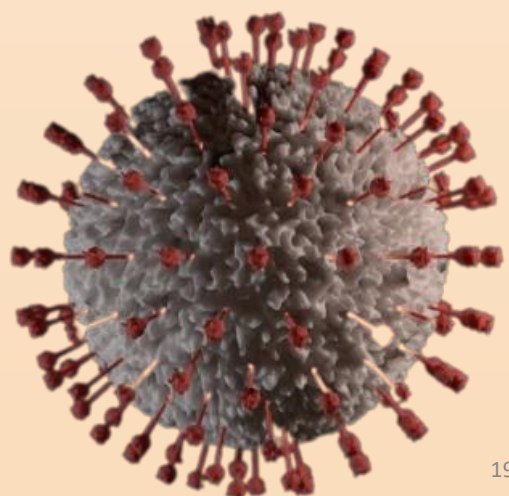
Antigenic shift and antigenic drift are two mechanisms by which viruses can

mutate over time.

Antigenic shift refers to a sudden and dramatic change in the surface proteins of a virus, which can occur through genetic reassortment. This can happen when a virus infects multiple host species, or when a virus co-infects a single host with a related virus. The new virus that results from antigenic shift may be able to infect hosts that were previously immune to the original virus, making it more dangerous and difficult to control. This phenomenon is seen in influenza viruses, where the antigenic shift in the H and N genes can cause pandemics.

Antigenic drift, on the other hand, refers to a gradual accumulation of small changes in the surface proteins of a virus over time. These changes can occur through mutations in the viral genome. Antigenic drift can make a virus less susceptible to the host's immune response, allowing it to evade detection and replication to continue. This type of mutation is common in influenza viruses, and it's the reason why a new flu vaccine must be developed each year to match the circulating strains!

Niviya K B
1st year BSc. BTGE



Bioethical Issues Pertaining To Cloning

The process of creating unique organisms with identical or nearly identical DNA, either through natural or artificial means, is known as cloning. Cloning can occur on the degree of DNA, a single cell, or the entire organism. Cloning, in the context of biomedical research, is broadly defined as the replication of any form of biological material including a segment of DNA or a single cell. For instance, a method known as the polymerase chain reaction, or PCR, is frequently employed in fundamental scientific research to duplicate DNA segments exponentially. The sort of cloning that is the subject of ethical debate is regarding the creation of cloned embryos, notably those of humans, which are genetically identical to the creatures from which they are derived, and the subsequent use of these embryos for further study, therapy, or reproduction.

Reproductive cloning has been critiqued for potentially violating fundamental philosophical concerns about the nature of reproduction and human identity. Since cloning could be used to generate "better" humans, compromising the principles of human dignity, freedom, and equality, worries about eugenics, the belief that the human species could be enhanced by the selection of individuals possessing desired features, have also surfaced. The advocates of therapeutic cloning, on the other hand, contend that it is morally required to advance medical research and treat the sick. They believe therapeutic and research cloning should be legal and publically financed. The fact

that women and couples should not be taken advantage of to obtain their eggs or embryos is also significant to many philosophers and policymakers.

To be therapeutically valuable in medicine, advances in biotechnology require both a knowledge of scientific concepts and ethical considerations. In this sense, therapeutic cloning holds tremendous promise for regenerative medicine by avoiding immunorejection and for the treatment of genetic diseases when combined with gene therapy. According to *in vivo* research, therapeutic cloning for cell replacement therapy has enormous potential for *de novo* organogenesis and the long-term management of diabetes mellitus, Duchenne muscular dystrophy, and Parkinson's disease.

Laws pertaining to biomedicine are typically written in ambiguous terms. Restricting reproductive cloning is expected to hinder therapeutic cloning-based medical research because both procedures need the *in vitro* creation of a human embryo.

Cloning comes with its strengths and limitations. The positive aspect of cloning comes into light by the fact that it can be used in the cloning of stem cells to enable the treatment of numerous ailments, in the preservation of many near-extinct species and also eliminating any risks of immunorejection as a result of transplantation, increasing life expectancy. Meanwhile, the limitation or the major concern pertaining to cloning has to do with the ambiguous areas of the law and research ethics. The procedure is not completely precise and safe. It is thought to be unethical, and misuse is highly likely.

**Divina Sicily Joseph
Pheba Paulose Abraham
1st year BSc. BTGE**

Culture Of Infusoria for Newly Hatched Fry

1. What is Infusoria?

Infusoria refers to a large number of microorganisms that live in water; these include unicellular algae, paramecium, protozoa, euglenoids, vorticella etc. these are found in many places such as natural water bodies like pond waters and established aquarium water.

2. Culturing infusoria (method)

Culturing infusoria is simple and should be started 2-3 days prior to the fry hatching or being born in the case of live bearing fish such as guppies, mollies

As an experiment 3 glass jars were taken. in each jar vegetables such as cabbage, spinach, lettuce, green peas were added. As these decompose, they act as food for the growth of bacteria on which infusoria feeds. Boiling water was added half way through in all the 3 jars, this breaks down the vegetables and makes it easy for the bacteria to grow. The jars were allowed to cool down and were labeled as A, B, C. Jar A was then completely filled with tap water, jar B was filled with pond water from outside and jar C was filled with water from an established aquarium tank. This added water acts as an inoculum of infusoria. The tap water usually doesn't contain these organisms and was merely used to check its purity.

These 3 jars were then placed in

sunlight for the next 3 days. Over a span of 3 days the water in the jars started to become cloudy indicating the growth of bacteria. Soon the water in jar B and C began to clear up and become less cloudy. This indicates the infusoria is growing and eating the bacteria as a source of food. Once the water has cleared up the infusoria has grown and is ready to be fed to the fish. This usually happens on day 4 at this stage the infusoria is visible to the naked eye as tiny white dots moving about in the jars. Jar A didn't show any infusoria growth.

3. Feeding the fry

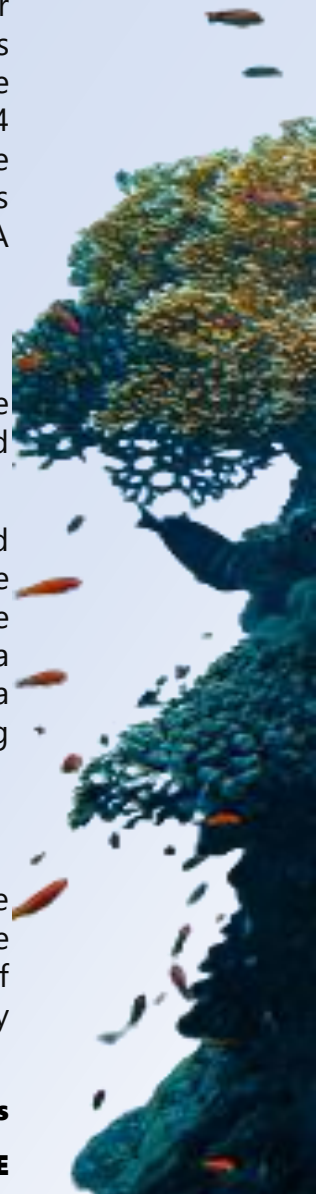
The fry should only be fed the culture after the water has cleared and the bacterial load is minimum.

The culture can be kept and maintained at room temperature for the next 2 days and should be discarded after that since infusoria stops growing and the bacteria starts growing back again making the water cloudy

4. Conclusion

As mentioned earlier the relative ease with which infusoria can be cultured and fed to the tiniest of the fry makes it preferred by amateur fish breeders.

Kagan Borges
1st year BSc. MBGE



Personalized Medicine

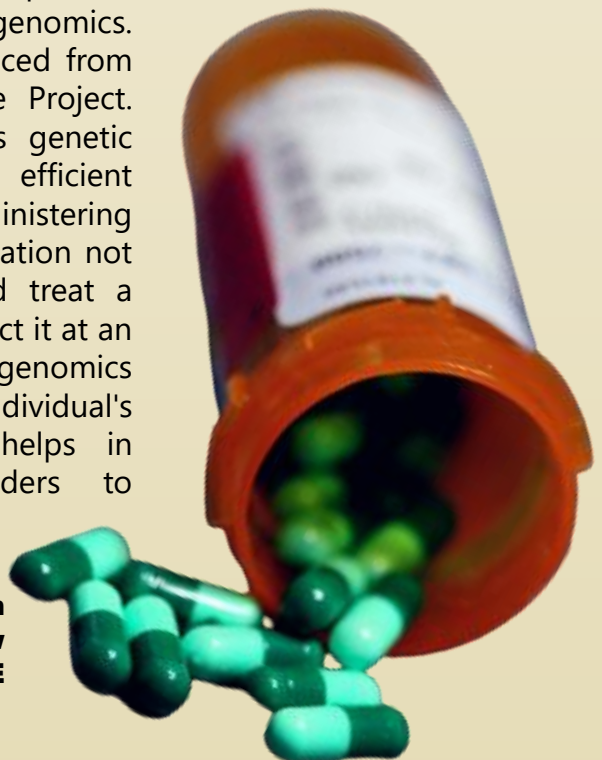
Personalized medication is an emerging practice of medication that uses an individual's genetic profile to guide the decisions made concerning the prevention, diagnosis, and treatment of the disease.

Approximately 6 years ago, a five-year-old child, Mila Makovec, was brought in having multiple seizures, foaming at the mouth, loss of vision, and developmental regression. Upon extensive testing, she was diagnosed with Batten's disease (a single mutation of the gene CLN7).

Timothy Yu, who at the time had a specialized gene lab that helped find root causes of genetic diseases, found that the mutation prematurely halted the RNA splicing process. On this Yu and 3 other fellow researchers began designing and testing different oligos on Mila's skin cells. Soon enough they picked an oligo that could partially restore the RNA splicing process in Mila's cells which they named MILASEN. The FDA approved administering the drug only after a 3-month safety study which was to be performed on rats but as Mila's health deteriorated, she was given the drug only after a 1-month of the study (the safety study did continue for 3 months to analyze any toxicity). From then on Mila's health is recovering slowly.

While this tailoring of treatment to patients dates back to the time of Hippocrates, this term has been made more popular in recent years due to the rapid growth of new diagnostic and informatic approaches that provide a much better and clear understanding of genomics. This personalized medication is being advanced from the data obtained in the Human Genome Project. Furthermore, this knowledge of a patient's genetic profile can help select the best and most efficient medication for the individual along with administering it using the proper dose. Personalized medication not only improves our ability to diagnose and treat a disease, but it also offers the potential to detect it at an earlier stage and treat it effectively. Pharmacogenomics plays an important role in determining an individual's variability to drug response and also helps in identifying responders and non-responders to medications.

**D'Cunha Jessica Newton
Ashita Mathew
1st year BSc. BTGE**



Eugenics - The Future

Eugenics is the practice or advocacy of improving the human species by selectively mating people with specific desirable hereditary traits. It aims to reduce human distress by "breeding out" disease, disabilities, and undesirable characteristics from the human population. Early supporters of eugenics believed people inherited mental illness, criminal tendencies, and even poverty, and that these conditions could be bred out of the gene pool.

The Future

"The best reason to learn history; is not to predict the future, but to free yourself of the past and imagine alternative destinies . Of course this is not total freedom - we cannot avoid being shaped by the past. but some freedom is better than none"- Yuval Noah Harari (Israeli historian).

The history of eugenics was troubling. There was no scientific evidence about gene regulation in humans and there was no data about the heredity of human beings. Today we know how a gene works and many fields in biology continue to study it. Today, most gene editing technologies are used in medicine and agriculture for human use . But what about the future?

Genetic engineering has the potential to be used for eugenic purposes. Some people worry that genetic engineering could be used to create "Designer Babies" or to eliminate certain genetic traits deemed undesirable .

The term "New Eugenics" is sometimes used to describe a modern form of eugenics that is different from the eugenics of the past. This new eugenics is not based on forced sterilization, forced abortion, or other forms of human rights abuses, but rather on the use of genetic technologies such as preimplantation genetic diagnosis (PGD) and genome editing to select certain traits or prevent certain genetic diseases. However, the concept of new eugenics is still controversial, as it raises many ethical questions, such as: Who will have access to these new genetic technologies? How to prevent the creation of a "genetic elite" or "genetic divide" "How to ensure that these technologies are used for the benefit of all, and not only for the few who can afford them?

One way to address the potential issues with new eugenics is through regulation and oversight of the technology. This could include setting guidelines for ethical use, monitoring for potential abuses, and investing in research to understand the long-term effects of genetic engineering. Additionally, it is important to engage in public dialogue and education about the potential benefits and risks of New Eugenics.

Niranjan KV
1st year BSc. BTGE





DEPARTMENT ACTIVITIES



Intracollegiate Fest for Undergraduate Life Sciences Students

23rd September 2022

The theme selected for Connoisseur 2022 was "Research, Recreate, Reward". The students of the first and second year undergraduate programs were divided into 17 groups, headed by two mentors each from the final year students. The fest comprised a mélange of eleven events, spanning from 19th -23rd September 2022, in which the students actively took part and showcased their hidden talents and skills. In addition to the regular events like Debate, Quiz, and Biomanager new events such as Graphical Abstract and Instagram Reel Making were introduced this year. All the events culminated to the success of Connoisseur 2022. The event was conducted by final year students for their juniors. Active participation by the first and second year students was observed which also made the intracollegiate fest a grand success.



Winners of Connoisseur, Group 8 Hexokinase

Expert Talk on “One Life One Planet”

24th September 2022

Centre for Environment and Sustainability, in collaboration with the Department of Life Sciences, Kristu Jayanti College, Autonomous, Bengaluru, organised an Expert Talk titled “One Life One Planet” on September 24, 2022. The speaker was Shri. A G Anil Kumar, a renowned philanthropist and environmentalist.

Mr. Kumar shared the multitude of his experiences on how he helped his village, Ananthapuram, overcome the horrors of the COVID pandemic. He motivated students to do their little towards society and the environment, inspiring the audience with his 'Heal Ananthapur,' 'Green Ananathapur,' 'Green Army,' and 'Home for Birds' campaigns.

Shri. Anil Kumar toured the campus and was impressed by the green initiatives of the college, which includes the medicinal garden, rainwater harvesting and landscaping. He identified spots where an aviary for birds could be set up on the college campus.



Industrial Visit To National Institute Of Animal Biotechnology(NIAB), Hyderabad

19th October 2022

As a part of earning academic credits for the completion of Post-Graduation in Life Sciences, students were taken for an institute visit to National Institute of Animal Biotechnology (NIAB), Hyderabad on 19th of October, 2022. The National Institute of Animal Biotechnology is an Indian autonomous research establishment of the Department of Biotechnology, Ministry of Science and Technology. National Institute of Animal Biotechnology (NIAB) is aimed to harness novel and emerging biotechnologies and take up research in the cutting edge areas for improving animal health and productivity. The Institute's focus of research will be on Animal Genetics and Genomics, Transgenic Technology, Reproductive Biotechnology, Infectious Diseases, Bioinformatics and Nutrition

Enrichment. The institute aims at translational research leading to the development of novel vaccines, diagnostics and improved therapeutic molecules for farm animals. The Institute plans to promote bio entrepreneurship by providing support environment for commercial tenants involved in the development of farm animal based products. Students were briefed about the working and operation of instruments such as confocal microscopes, Florescent Microscopes, Flow cytometer, genotypic analysis and Animal cell culture units. Students visited Dr. Pankaj Suman's laboratory in NIAB, where they were briefed on the development of aptamer, antibodies and nanozymes based technologies for development of diagnostics and therapeutics.



Vidwat Sammilan with Prof. BJ Rao Vice Chancellor, Central University Hyderabad

4th November, 2022

Department of Life Sciences, Kristu Jayanti College, Autonomous, organised the third edition of Vidwat Sammilan on "Biology is noisy, Fuzzy but very robust: Why and How?" with Prof. BJ Rao, Vice Chancellor, Central University of Hyderabad as the resource person. From thematic sessions to discussions on cross-cutting priorities for transforming education, "Vidwat Sammilan" is concerned with the presentation of national statements of commitment by institutional leaders in the form of interactive lectures. Professor Basuthkar Jagadeeshwar Rao has made fundamental contributions to the molecular basis of genome dynamics, computational biology, cellular physiology and metabolism.

Asserting the need for a reductionist approach to understanding science, Prof. Rao emphasized that by encompassing ontological, epistemological, and methodological assertions regarding the interrelationships of various scientific areas, one can dissect complex systems into simpler modules. He went on to add that methods based on nonlinearity can be used to solve a variety of fascinating problems in various subfields.



48th Edition of Vichaarmanthan with Padma Shri. T.S. Chandrasekar Chairman and Chief of Gastroenterology Medindia Hospital, Chennai

25th November 2022

The Department of Life Sciences, Kristu Jayanti College, organized the 48th edition of VICHARMANTHAN- An interaction with Indian and global visionaries on 25th November 2022 at SKE auditorium. The resource person, Padma Shri Dr. T.S. Chandrasekar, Chairman & Chief Gastroenterologist, Medindia hospitals, Chennai, started the session with examples of achievements by great personalities that emphasized the importance of hard work and dedication. He detailed on topics such as essentials of motivation, levels of motivation, and Godspeed by providing valuable information regarding their implementation for the betterment of life. He emphasized the importance of utilizing the opportunities provided and to contribute to society. He gave an insight into how his 37 years of professional life were rewarded in 37 seconds with the Padma Shri award. Dr. T.S. Chandrasekar quoted various motivational life examples which instilled the young minds. He concluded his session by providing valuable suggestions on how we must be motivated to become successful people. The program culminated with a lively interactive session in which all the queries were addressed. The session was very informative and gave the students, knowledge on motivation and its effectiveness, along with an understanding of the impact it has on society.





International Expert Interaction with Dr. Joseph Ajay Pathakamuri

13th December 2022

The Department of Life Sciences, Kristu University. He briefed about the Jayanti College, organized an interaction examination and assessment patterns. Dr. with eminent professor from Franciscan University of Steubenville. On 13th December 2022, Dr. Joseph Ajay Pathakamuri, Professor, Department of Biology, Franciscan University of Steubenville, Ohio, USA, was invited for an interaction with faculty members of the Department of Life Sciences. The session commenced with a brief welcome address by Dr. Calistus Jude, Dean Faculty of Sciences. He also introduced the chief guest to the gathering. Dr. Joseph started the interaction by giving a glimpse about Franciscan University of Steubenville, Ohio, USA. He discussed about the pedagogy adopted for teaching in his

University. He briefed about the examination and assessment patterns. Dr. Joseph, an expert in virology delivered a lecture on 'Insights into corona virus biology'. He also discussed about the various measures adopted in regard to COVID protocol in their University. Dr. Joseph mentioned about the possibility of student and faculty exchange between KJC and Franciscan University. He emphasized on collaborative research between the institutions. The faculty members of the department interacted with Dr. Joseph and he addressed all the queries. The vote of thanks was proposed by Dr. Sonia Angeline. The interaction concluded with a formal group photograph.



International Conference on Plant-microbe Synergy: Unravelling Strategies For Natural Resource Management

24th & 25th January 2023

The Department of Life Sciences, Kristu Jayanti College, organised a two-day international conference for the year 2023, "Plant-Microbe Synergy: Unravelling Strategies for Natural Resource Management". The Conference provided a leading interdisciplinary platform for scientists, researchers, industry experts, and academicians across the globe to interact and share their knowledge and ideas. The conference began with the inaugural session. Fr. Jais V Thomas, delivered the Presidential address and through his inspiring words, he emphasized the role of science in solving food and other issues to add quality to mankind. Our esteemed chief guest, Dr. R.P Tewari,

Former Director, ICAR- Directorate of Mushroom Research, Solan; and Director, Saptarishi Agro Industries Pvt. Ltd., Ahmedabad, during his inaugural address, shared his practical work of utilizing agro waste in providing food for mankind. Dr. N B Prakash, Professor, University of Agricultural Sciences, Bangalore, in his address, shared the role of rich soil in natural resource management in plant-microbe interaction for improving food production. As a part of the conference six plenary sessions were organized with eminent resource persons and research scholars participated in technical paper presentations.

Bioventura 2023 Intracollegiate Fest

7th February 2023

Department of Life Science organised the Intracollegiate fest "Bioventura 2023" with the theme "MICROBIOME" with the tagline "Into the Biocosmos". The students of the first-year postgraduate programs were segregated into 12 groups headed by one mentor from the final year. The fest comprised a mélange of eleven events, spanning from January 30th to February 7th 2023, in which the students actively participated and demonstrated their hidden talents and skills. In addition to the regular events like Debate, Quiz, and Biomanager, new events such as Graphical Abstract and Instagram Reel Making were introduced this year. The most anticipated event, Exonimpresario (the Biomanager), was conducted. The preliminary forum was held in two rounds on January 30th, February 03rd and February 03rd, respectively, comprising an aptitude test, introductory session, personal interview, and telemarketing. A total of 16 participants were evaluated on their capacity for reasoning and executive skills. Then, each of them voiced their opinions in an open forum designed to assess their public speaking abilities. The willpower and managerial abilities of the students were tested before naming a "Biomanager" through the final round. The overall winner for the Bioventura 2023 was the Agaricus Daredevils, and the overall runners were bagged by the group Tapeworm Slytherins.



Field visit to Sula Vineyards, Channapatna, Karnataka

13th February 2023

In order to align academic knowledge with industrial realities, the Life Sciences Department of Kristu Jayanti College conducts an annual field visit for their final-year students. This year, the visit was scheduled for Monday, February 13th, 2023, and took place at Domaine Sula, the winery of "Sula Vineyards" in Karnataka. The visiting group was mainly composed of IV semester students from the Master of Science programs in Microbiology, Biotechnology, and Biochemistry, accompanied by two members of the faculty, Dr. Challaraj Emmanuel and Dr. Sonia Angeline.

Domaine Sula is located in the immediate vicinity of Bangalore (Karnataka), on the Bangalore - Mysore highway. With the state of Karnataka being the second-largest grape-producing region with emerging wine culture, the vineyard Domaine Sula encapsulates all things wine beautifully and depicts the rich heritage of Indian sustainable winemaking. It is also a perfect picnic spot for those exploring wine tourism with attractions like wine-tasting sessions, winery tours, gourmet dining options, and lots of delicious wines. It took a total of 3 hours to explore the winery facilities and infrastructures open to the

public, followed by a walk in the vineyard, then a tour of the cold room serving as a wine cellar, and finally the wine tasting.

This guided tour was an opportunity for the students to learn about the process of winemaking, or as would say the guide: "a journey of a grape to glass". First of all, they started with the crush pad area and washing room, where the students could see how trucks coming from different locations were unloading bunches of grapes that will further be crushed and pressed to obtain the grape juice. After that, they moved to the fermentation room where tanks of impressive size are stored and used for the fermentation of the grape juice which was filtered in advance, to remove all the solid impurities. Here, the guide explained how the yeast inoculums were added to the juice with other elements before proceeding with the fermentation. The normal conditions of temperature, pH, and pressure are also well monitored and maintained according to production requirements. Many of them came out of this outing with business ideas related to the fermentation of agricultural products, and they will keep a lot of good memories from the day.



Field Visit To Water Treatment Plant, TK Halli

14th February 2023

Bangalore Water Supply and Sewerage Board (BWSSB) currently supplies approximately 900 million liters (238 million gallons) of water to the city per day, despite a municipal demand of 1.3 billion liters. Water for the city (with a population of 10 million) comes from a number of sources, with 80% of it coming from the Cauvery River. This Kaveri River project is the major water scheme for Bangalore and is imported by the BWSSB from the Cauvery River, over 100 kilometers (62 mi) south of the city. Cauvery water was originally drawn from a reservoir near the village of Thorekadanahalli. To meet the increasing demand, the "Cauvery Water Supply Scheme" was undertaken by the BWSSB, with Stages I - III completed. Stage IV is currently being built, with Phase, I completed and bringing an additional 270 million liters to the city. Construction of

Stage IV: Phase II is expected to bring an additional 510 million liters, and will be completed by 2010.

Engineer In Charge of the Visit Er. Diwakar explained to students, that the plant is Asia's biggest water purification plant with 5 stages of purification and pumping along with conventional and latest technology as its unique and exclusive just 52 employees to handle the entire plant. During the visit, students learned about the identification of the level of impurities in water, the formation of the layout of the plant, identifying the level of Chlorine in the plant, and the technology adopted (Pulsification and DAF) for better water treatment. The visit provided an opportunity for students to get exposure to industry situations and practical experience which facilitated them to enhance their skills and industry understanding.



STUDENT COORDINATORS FROM THE DEPARTMENT OF LIFE SCIENCES



SANJAY S KUMAR
Life Science Club
Secretary
2020 BSc MBG



NANCY SHARMA
Life Science Club
Secretary
2020 BSc BBB



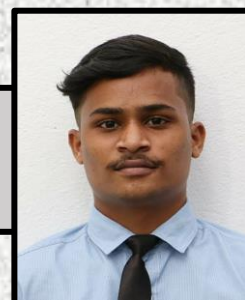
SANJITH INFANT SON L
Sports & Games Club
Secretary
2020 BSc BBB



KANIKA DADHICH
Sports & Games Club
Secretary
2020 BSc BBB



CHRIS SEBASTIAN P
Literary & Cultural
Association Secretary
2020 BSc MBG

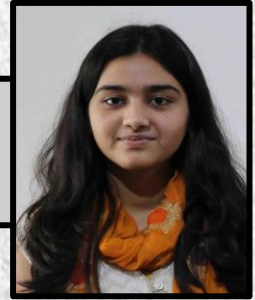


PAGADALA VIJAYA
Environment Club
Secretary
2020 BSc BBG



SANDRA DEVIASSY
Environment Club
Secretary
2020 BSc BBB

KHUSHI TIWARI
Hindi Club Secretary
2021 BSc BTGE



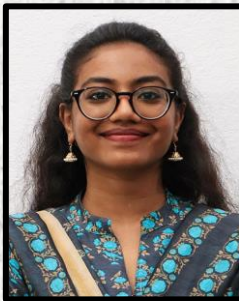
SAI KIRAN K
Quiz Club Secretary
2020 BSc BBG



SPANDANA M
Centre for Social
Activities Secretary
2020 BSc BBB



SMITHA SANDRINA
Women Empowerment
Club Secretary
2020 BSc MBG



FRANCI JAIN
KCDC
2020 BSc MBG



BENITA J H
Student Council –
General Secretary
2021 MSc MB





GALLERY





Overall champions in Jeevotsav intercollegiate fest at Christ deemed to be University

Overall Runners Up of Connoisseur'23 held by the Department of Life Sciences, Kristu Jayanti College



Overall Winners of E Week held by the Department of Commerce, Kristu Jayanti College



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